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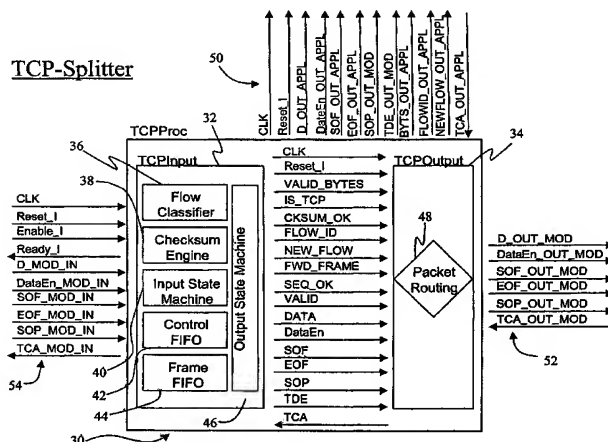
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[Continued on next page]

(54) Title: TCP-SPLITTER: RELIABLE PACKET MONITORING METHODS FOR HIGH SPEED NETWORKS



(57) **Abstract:** A method for obtaining data while facilitating keeping a minimum amount of state is provided. The method includes receiving at a first device an Internet Protocol (IP) frame sent from a second device to a third device wherein the first device is in a flow path between the second and third devices, the first device including at least one of an Application Specific Integrated Circuit (ASIC) and a Field Programmable Gate Array FPGA. The method also includes removing an embedded stream-oriented protocol frame including a header and a data packet from the received IP frame with at least one of the ASIC and the FPGA, and determining a validity of a checksum of the removed stream-oriented protocol header. The method also includes dropping the IP frame when the checksum is invalid, supplying a client application with data from the removed protocol frame when the checksum is valid, and sending an IP frame including the removed stream-oriented protocol frame to the third device from the first device when the checksum is valid.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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INTERNATIONAL SEARCH REPORT

national Application No
PCT/US 03/25123

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04L12/26 H04L29/06 H04L12/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04L G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 6 397 259 B1 (HAWKINS JEFFREY C ET AL) 28 May 2002 (2002-05-28) column 9, line 13 - column 13, line 17 column 18, line 1 - column 20, line 3 column 86, line 53 - column 111, line 67 -----	1,3-9, 11,31,33 2,13-20, 22
A	WO 01/80558 A (SOLIDSTREAMING INC) 25 October 2001 (2001-10-25) column 24, lines 7-13 column 17, line 20 - column 18, line 3 column 6, lines 19-21 column 3, line 10 - column 4, line 2 ----- -/--	1-9,11, 13-20, 22,31,33

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 397 335 B1 (BRETSCHER JOHN THOMAS ET AL) 28 May 2002 (2002-05-28)	48,49, 51,56, 79,80, 82,87
A	column 3, line 9 - column 5, line 12 column 6, line 30 - column 7, line 65 column 12, lines 15-38 column 13, lines 40-46 -----	
X	WO 02/061525 A (HALL HOWARD ; MERHAR MILAN (US); PIRUS NETWORKS (US); SOKOLINSKI ILIA) 8 August 2002 (2002-08-08) page 4, lines 11-18 page 98, line 1 - page 102, line 32 -----	58,89
A	US 6 412 000 B1 (PACKER ROBERT L ET AL) 25 June 2002 (2002-06-25) column 2, lines 35-43 column 4, lines 5-17 column 12, line 64 - column 13, line 10 -----	58,89

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/25123

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1-9, 11, 13-20, 22, 31, 33, 48-51, 56, 58, 79-82, 87, 89
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-9,11,13-20,22,31,33

A method and an apparatus, comprising dropping an IP frame when the checksum is invalid, and configured to classify removed protocol frames as at least one of a sequence number greater than expected classification, a sequence number equal to expected classification, a sequence number less than expected classification.

2. claims: 10(as dep. on 1),21 (as dep. on 13),35-47,66-78

Method comprising a client counting bits.

3. claims: 12(as dep. on 1),23(as dep. on 13)-30,34,65

A method, an apparatus, a network, a data transmission system, and an FPGA, comprising determining if a frame contains programming data.

4. claim: 32

Method on a network using a single TCP/IP source and a single destination.

5. claims: 48-51,79-82

Method and apparatus comprising manipulating a stream such that a second device receives data different than that sent from the first device.

6. claims: 52-55,57,59-64,83-86,88,90-95

Method and apparatus comprising using a plurality of content scanning engines.

7. claims: 56,87

Method and apparatus to detect a content match that spans multiple packets.

8. claims: 58,89

Method and apparatus comprising handling overlapping transmissions using a data enabled signal and a valid bytes vector.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/25123

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6397259	B1	28-05-2002	AU 4210099 A	13-12-1999
			AU 4407899 A	13-12-1999
			CA 2333033 A1	02-12-1999
			CA 2333055 A1	02-12-1999
			EP 1088421 A2	04-04-2001
			EP 1092186 A1	18-04-2001
			GB 2353923 A	07-03-2001
			GB 2357222 A	13-06-2001
			WO 9961984 A1	02-12-1999
			WO 9962268 A2	02-12-1999
WO 0180558	A	25-10-2001	AU 5174801 A	30-10-2001
			WO 0180558 A2	25-10-2001
US 6397335	B1	28-05-2002	US 5987610 A	16-11-1999
			US 2002138766 A1	26-09-2002
			US 2002174350 A1	21-11-2002
			AU 2577399 A	30-08-1999
			WO 9941875 A1	19-08-1999
WO 02061525	A	08-08-2002	AU 2010802 A	15-05-2002
			AU 2719102 A	15-05-2002
			AU 3058502 A	15-05-2002
			AU 4155902 A	18-06-2002
			WO 0237300 A1	10-05-2002
			WO 0246866 A2	13-06-2002
			WO 02061525 A2	08-08-2002
			WO 02069166 A1	06-09-2002
			WO 0237224 A2	10-05-2002
			WO 0237225 A2	10-05-2002
US 6412000	B1	25-06-2002	US 2002143939 A1	03-10-2002
			US 2002055998 A1	09-05-2002
			AU 1421799 A	15-06-1999
			WO 9927684 A1	03-06-1999